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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/937,538	09/25/2001	Michihiro Mizuno	81839.0102	2057

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EXAMINER

SIEFKE, SAMUEL P

ART UNIT PAPER NUMBER

1743

DATE MAILED: 06/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/937,538

Applicant(s)

MIZUNO, MICHIOHIRO

Examiner

Samuel P Siefke

Art Unit

1743

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 08 March 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1, 7 and 13 is/are rejected.
- 7) ☒ Claim(s) 2-6, 8-12, 14-18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Arguments

Applicant's arguments filed 12/08/04 have been fully considered but they are not persuasive. Applicant argues, "The JP '174 reference does not describe a method for evaluating concentration of metal impurities contained in a silicon wafer, as in the case of the present invention." JP '174 discloses each and every limitation of the claimed invention in the present application. JP '174 discloses dropping concentrated sulfuric acid onto a surface of the silicon wafer to extract metal impurities solid-solubilized in the inside of the silicon wafer into the concentrated sulfuric acid, and chemically analyzing metal impurities contained in the concentrate sulfuric acid. The instant application drops concentrated sulfuric acid onto a surface of a silicon wafer, the prior art does the same. The instant application collects the sulfuric acid and analyzes the sulfuric acid to determine if any impurities are contained in the sulfuric acid, the prior art does the same. The Office views JP '174 to disclose each and every limitation set forth by claim 1 of the instant application.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1 is rejected under 35 U.S.C. 102(b) as being anticipated by JP 409015174.

JP '174 discloses a method for chemical analysis of a surface of a silicon wafer. First the pressure in the vessel is reduced by a vacuum pump and a silicon wafer is heated by a hot plate (2) to condense a chemical by evaporation. Then a very small quantity of recovery solution (sulfuric acid or fluoric acid) is dropped onto the surface of the wafer (3). Scanning is made all over the surface of the wafer so as to dissolve and recover an evaporation residue, and impurities in the recovery solution are then analyzed (abstract). The abstract refers to the heating temperature being relatively low because of the high sulfuric acid boiling point and also heating under pressurized circumstances requires a lower temperature to evaporate a substance. It is inherent that if one did not use a vacuum then the temperature required to heat the wafer in order for the chemicals in the wafer to come to the surface would be significantly higher, but under the boiling point of sulfuric acid which is 280° C.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 7 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over JP 409015174 in view of Watanabe (USPN 6,444,010).

JP '174 discloses a method for chemical analysis of a surface of a silicon wafer. First the pressure in the vessel is reduced by a vacuum pump and a silicon wafer is heated by a hot plate (2) to condense a chemical by evaporation. Then a very small quantity of recovery solution (sulfuric acid or fluoric acid) is dropped onto the surface of the wafer (3). Scanning is made all over the surface of the wafer so as to dissolve and recover an evaporation residue, and impurities in the recovery solution are then analyzed (abstract).

JP '174 does not teach the impurity to be recovered is Cu.

Watanabe teaches an impurity recovery liquid and method for recovering an impurity. The impurity of interest includes Cu element. The modified method of JP '174 would be useful for wafers with any degree of resistivity. Therefore it would have been obvious to one having a skill in the art to modify JP '174 to recover the Cu impurity because copper is a common impurity in silicon wafers and measure the resistivity of the wafer.

Allowable Subject Matter

Claims 2-6, 8-18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. Claim 2 would be allowable because the prior art does not teach or fairly suggest putting another uncontaminated wafer on the concentrated sulfuric acid on the silicon wafer to hold the concentrated sulfuric acid between the wafers, and subjecting the whole of the wafers in that state to a heat treatment (specifically 100°C to 270 °C). Claim 4 would be allowable because the prior art does not teach or fairly suggest neutralizing the concentrated sulfuric acid on the silicon wafer by exposing it to an ammonia gas atmosphere.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel P Siefke whose telephone number is 571-272-1262. The examiner can normally be reached on M-F 7:00am-5:00pm.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jill A. Warden can be reached on 571-272-1700. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Sam P. Siefke



May 20, 2004


Jill Warden
Supervisory Patent Examiner
Technology Center 1700